On the 29th a small tornado struck Cooperative Observer J. Clarence Norton at Moran, Allen County, Kans., while working in a field, at 3:37 p. m. He writes:

The tornado reported by me was a small one and originated 1 mile west of me and did not hit any buildings or trees in its course. It was 50 yards wide, came down out of a fair sky, and when it hit the plowed land the dust rose in such amounts as to make all in its path as dark as night.

It took all my strength to keep it from sucking me off the lister.[1] The terrific wind and suction and ice-cold center of the inky black whirling mass of dust and cornstalks was indeed terrifying, and my team and myself were surely alarmed. The lister was all that held the team down. Half a mile east of here the tornado rose up.

No material damage seems to have been done, and this storm was dissipated before reaching any other person or any buildings.

A tornado occurred in the east-central part of Butler County and passed to the west-central part of Greenwood County, Kans., on February 22, 1909. The storm destroyed about $10,000 worth of property and injured six or eight persons, but so far no deaths have been reported.—*C. A., jr.*

TORNADOES IN TENNESSEE.

[Extract from Monthly Climatological Report, Tennessee Section, April, 1909.]

Violent thunderstorms and tornadoes occurred on the afternoon of April 29 and the night of the 29–30th at many places in Tennessee, in connection with the passage of an area of low atmospheric pressure of unusual depth and extent, the center of which moved from Kansas (7 a. m., 29th) to Michigan (7 a. m., 30th). This low pressure area, or storm center, at 7 a. m. April 29, was the controlling influence in the weather conditions over the entire central portions of the country, from the Rocky Mountains to the Allegheny Mountains. In its south and east quadrants unusually high temperatures prevailed at 7 a. m., with light to brisk southerly winds; but very little rain had fallen, the sky being generally partly cloudy to cloudy. About the center of the low pressure area, in Oklahoma and Kansas, there was a sharp contrast in temperature; for example, at Oklahoma the temperature was 72°, while at Amarillo it was 50°; at Kansas City it was 72°, while at Dodge City it was 48°. West of the center of the low pressure area temperatures were moderately low. The conditions were favorable for thunderstorms and squalls in Tennessee, as was stated in the forecast printed on the weather maps of the morning of April 29.

The first violent winds seem to have occurred about 2 p. m. in Hamilton County. This disturbance apparently moved northeastward and reached the vicinity of Knoxville about 4 p. m.

The most clearly defined and the longest tornado track, see fig. 1, *1*, was made across the State from the extreme southwest corner northeastward to Scott County. This tornado came from Mississippi, struck White Haven, Shelby County, Tenn., at 7:30 p. m.; struck a section a few miles east of Somerville, Fayette County, at about 8:30 p. m.; vicinity of Henderson, Chester County, about 9 p. m.; vicinity of Centerville, Hickman County, about 10:30 p. m.; Hillsboro and Franklin, Williamson County, about 11 p. m.; Algood and Cookeville, Putnam County, about 1 a. m. (30th). The width of this track varied from a few hundred yards to about one mile.

A second well defined tornado track, see fig. 1, *2*, extended from the vicinity of Cuba, Shelby County, northeastward through Haywood, Gibson, Carroll, Humphreys, Dickson, and Montgomery counties. This track was parallel with *1*, and the time of occurrence of the tornado was about the same. Its width varied from about 200 yards to about 2 miles.

A third track, see fig. 1, *3*, extended through Giles and Lincoln counties northeastward, the tornado being apparently dissipated in the mountains. It struck the vicinities of Pulaski, Bryson, and Fayetteville about midnight. Its track was about one-half mile wide as it passed through the southern part of Giles County.

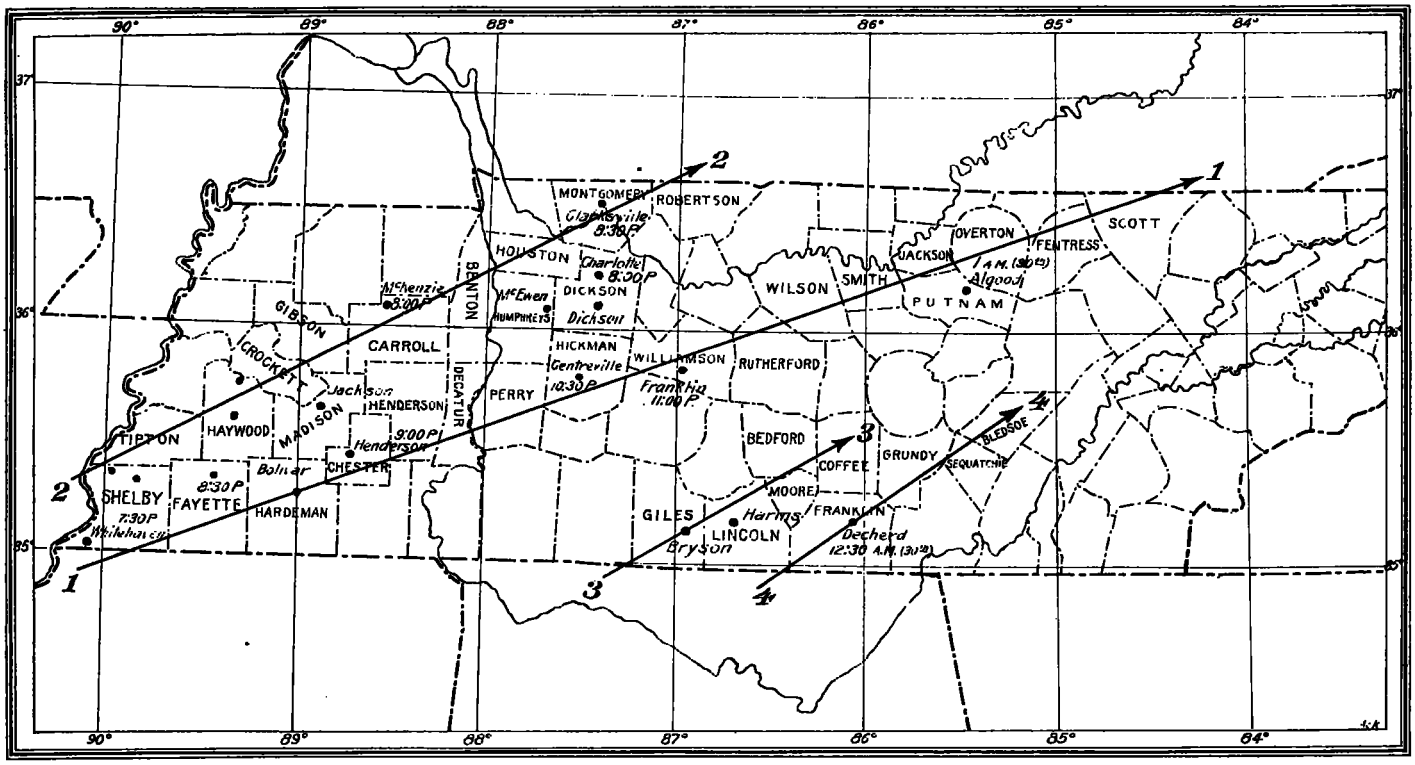

FIG. 1.—Tornado paths across Tennessee, April 29, 1909.

[1] A special kind of plow having a double mould board.

A fourth track, see fig. 1, 4, passed through Franklin County, the tornado striking Decherd about 12:30 a. m., April 30, and apparently passing, with diminished violence, through Grundy and Meigs counties. Its track was about 2 miles wide at Decherd.

Each of these terrific disturbances was accompanied by the usual distinctive marks of the tornado—pendant funnel-shaped cloud, narrow path, destructive violence and scattering of debris in all directions.

Deaths were reported as follows: Giles County, 22; Lincoln County, 7; Williamson County, 8; Montgomery County, 4; Chester County, 4; Hickman County, 10; Franklin County, 4; Hardeman County, 1. The list is not complete for the State. A hundred or more people were reported injured, a number fatally. The property loss was estimated as follows: Giles County, $100,000; Lincoln County, $100,000; Montgomery County, about $25,000; Williamson County, $100,000; Chester County, about $15,000; Shelby County, about $150,000; Hickman County, $150,000; Algood and vicinity, about $10,000; Decherd and vicinity, about $150,000; Bolivar and vicinity, about $5,000. The losses are not all reported, and the amounts given are only approximately correct.—*H. C. Bate.*

TORNADOES IN MISSISSIPPI.

By W. S. BELDEN, Section Director.

On the evening of April 6 a tornado passed through the suburbs of Aberdeen, Miss., killing five persons, seriously injuring several others, and destroying considerable property.

At about 7:30 p. m. April 29 a tornado approximately one-half mile in width and moving in an easterly direction passed through the villages of Horn Lake and Plumpoint, which are located in the extreme northern portion of De Soto County, Miss. Six persons were killed by the storm, four or five injured, and the loss of property was heavy. This storm also did considerable damage in Tennessee.

SEVERE LOCAL STORM AT CLEVELAND, OHIO.

By JAMES KENEALY, Local Forecaster. Dated Cleveland, Ohio, May 22, 1909.

On the morning of April 21 the daily weather map showed a deep cyclonic trough extending from the Texas coast to Lake Superior, with the disturbance central near Springfield, Ill., where the barometer then stood at 29.40 inches. At 7 p. m. of that day the telegraphic reports showed the axis of the barometric trough to have advanced to a north-south line extending through Lakes Huron and Erie and the upper Ohio Valley, with the center of the depression located near Saugeen, Ontario, from which station a barometric reading of 29.24 inches was reported. The local storm at Cleveland occurred between noon and 1 p. m., in the southeast quadrant of the cyclone whose center was then passing northeastward near the southern border of Michigan. At Cleveland the day began with cloudy and threatening weather, light winds from the east, with the temperature stationary at 43° during the hours from midninght to 4 a. m., the morning minimum. The barometer fell slowly during the hours from midnight to 7 a. m., and the barograph showed a few slight oscillations in the pressure during that period. At 7 a. m. the temperature had risen to 46° and the wind had veered to southeast, increasing to a velocity of 20 miles per hour, with gradually diminishing pressure. Light rain began at 7:05 a. m. and ended at 9:30 a. m., the shower giving a total rainfall of 0.14 inch. A few rumbles of thunder were heard in the northeast about the time the shower ended. By 8 a. m. the temperature was beginning to rise quite rapidly, with fast diminishing pressure. The southeast wind steadily increased and a squall between 10 and 11 a. m. attained a velocity of 42 miles per hour for five minutes. From this time till noon the wind gradually decreased to moderate, with generally cloudy weather, though a few minutes of sunshine had followed the shower. The temperature had risen from 43° at 4 a. m. to 51° at 9 a. m., reaching 68° at noon, its maximum for the day, while the barometer had fallen from 28.97 inches to 28.59 inches during the same interval.

At 12:25 p. m. a threatening cloud appeared in the southwest; at 12:30 p. m. there were a few vivid flashes of zigzag lightning and moderately heavy thunder in the west, and the sky darkened rapidly; at 12:31–12:34 the wind veered suddenly to southwest and west and, with a squall of hurricane force, came a very abrupt increase in pressure, rapidly falling temperature, a heavy downpour of rain, and some hail. The barometer rose 0.15 inch in about twenty minutes and the temperature fell from 68° to 46° in the same period of time. The fall of hail lasted about a minute, the hailstones were about the size of peas, and the precipitation from hail melted was estimated as 0.01 inch. As is common during the climax of severe thunderstorms, the darkness at this time was intense, and it continued so for three or four minutes. The wind reached its greatest violence during the three minutes that it was from the west, 12:31 to 12:34 p. m., and no doubt the greatest damage was done by this west wind. It blew at the rate of 72 miles per hour during the minute from 12:32 to 12:33 and 84 miles per hour during the minute from 12:33 to 12:34 p. m. The maximum 5-minute rate was 66 miles per hour, from 12:31 to 12:37 p. m. For the nine minutes, 12:31 to 12:40 p. m. the wind blew at the rate of 40 miles, or more, per hour. After this time the temperature and pressure conditions returned rapidly to those appropriate for their location with reference to the center of the cyclone, and the rain, which had begun at 12:22 p. m., finally ended at 2:14 p. m., with a total registered precipitation of 0.20 inch, most of which fell during the time of the squalls. The last thunder was heard in the northeast at 1:02 p. m. From 1 to 3 p. m. the winds were from southwest to south, brisk to moderate in force; by 2 p. m. the temperature had risen to 59°, and by 5 p. m. it had risen to 66°, with sunshiny weather. Later in the day moderate to brisk southwest winds veered to west, with a change to cooler, and the minimum temperature of the day, 42°, occurred at midnight, following the passage of the large cyclonic area to the northeastward.

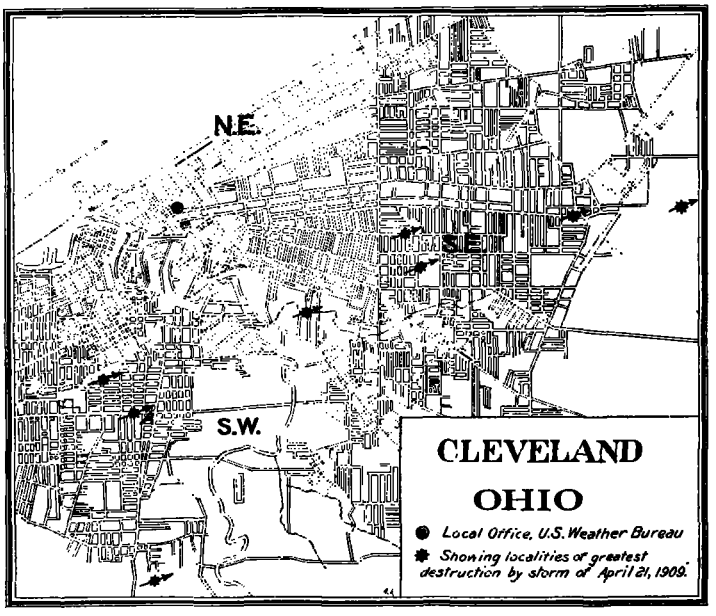

FIG. 1.—Path of storm through Cleveland, Ohio, April 21, 1909.

Casualties and damage to property.—Considering the number of persons killed and injured and the damage to property, the storm was the most disastrous that the city has ever suffered. Seven persons were killed by flying debris, collapsing build-